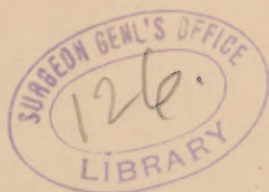


Emerson (N. B.)

a clinical study of tetany.

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A CLINICAL STUDY OF TETANY.

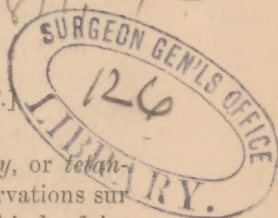
BY N. B. EMERSON, M.D., OF NEW YORK.

In, Am. Neurol. Ass., N.Y. 1877, p. 179

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THE disease which is now generally known as *tetany*, or *tetani-
illa*, was first described in the adult by Dance (Observations sur
une Espèce de tétanos intermittent), in 1831, as a kind of in-
termittent tetanus, after him by Delaberge, Delpech, Imbert-
Gourbeyre, Tonnelé, Constant, Corvisart, and others. Besides
the names already mentioned, it has been called *contracture of
the extremities*, *rheumatic contracture of muscles*, *intermittent
rheumatic contraction*, etc. The compact and euphonious title
tetany was given to this disease by Lucien Corvisart (De la con-
tracture des extrémités, ou tétanie, Thèse de Paris, 1852), and has
proved its fitness by surviving when other more cumbersome
names have fallen into desuetude.

In the spring of the year 1846 there occurred in Belgium,
principally in the prisons, an epidemic of tetany, which was made
the subject of study and special report before the Paris Academy
of Medicine, by M. Vleminkx, Sanitary Inspector General of
Prisons. He describes the disease as announcing itself by numb-
ness, tingling or prickling, sometimes twinges in the feet and
hands. Very frequently the sensations extended upward the
whole length of the limbs. There were even cases in which it
reached the walls of the abdomen and chest, the face and scalp.
In this event the patient experienced vertigo and extreme weak-
ness. "Tact was frequently modified in such a way that touch-
ing, walking, etc., gave rise to quite bizarre perversions of sensa-
tion." . . . "In a small number of the patients there was
complete abolition of sensibility." "To these symptoms there



constantly succeeded, and this is the dominant character of the disease, *muscular contracture* of the limbs, which presented two perfectly distinct forms, to wit: *simple* and *spasmodic* contracture." (M. Vleminkx, article *Epidémie de Contracture en Belgique*, *Gaz. Méd. de Paris*, May, 1846, p. 401.)

The description of the motor as well as of the sensory symptoms, which follows the above, as reported by Vleminkx, is in such substantial accord with that which I myself have observed in the cases herein reported, that, in order to avoid undue repetition, I shall make my own clinical description of these motor symptoms suffice, without further quotation at present.

Notwithstanding the rarity of this disease I have been favored with the opportunity of studying tetany in the two following cases:

CASE I.—F. S., female, aged twelve years, domestic, born in the United States, presented herself for treatment April 24, 1876, for what was well described by the woman who accompanied her as rheumatism with cramps and stiffness of the muscles.

Eleven days before, having previously enjoyed good health, while undergoing her first menstruation, this girl ignorantly bathed her genitals in cold water, with the effect of staunching the sanguinolent flow, which was soon followed by a purulent vaginal discharge. The next day the right elbow and knee-joints, and soon after the heel and foot of the same side became swollen and inflamed, making walking quite painful. Very soon the muscles of the left arm and leg were found to be stiff; and before long the arm became rigidly fixed in the attitude of semi-flexion, while the leg and foot were in that of extension.

Voluntary efforts by the patient to flex still further or to extend the arm or leg were unavailing.

In a few days the symptoms subsided, and in about a week had nearly disappeared, leaving the muscles free from rigidity and the joints only slightly affected with swelling.

No sooner, however, had the affection subsided on the right, than a similar process was set up on the corresponding parts of the left side of the body. The left elbow, and then in a short time the left knee, became affected with pain, heat, and swelling, followed by contracture of the muscles in a manner similar to what had existed on the right side.

Unlike the former, there was, during the early part of this second attack, a decided sensation of dysæsthesia in the arm and

leg affected, consisting of a feeling of numbness, and a tingling as of "pins and needles," which passed away after the contracture had become established.

When first seen by me the condition was, as follows: The left elbow and knee were tumefied, hot, and tender to the touch, though not acutely so, and the cavity of the knee-joint especially was distended with considerable effusion. The deformity of the limbs was quite peculiar. The thumb and fingers were flexed, and their points drawn together in such a manner as to approximate the form of a cone; the hand was flexed on the forearm, and the forearm on the arm, giving the whole limb somewhat the shape of a sickle.

The contracture of the left leg assumed the form of extension, producing in this limb a deformity similar to that of talipes equinus. In the arm the biceps and brachialis anticus, the flexors of the hand and fingers, and the muscles of the thenar and hypothenar eminences were in the condition of tonic contraction, causing their bodies to feel firm and rigid to the touch, while their tendons were tense and prominent.

The counter-resistance of their opponent muscles was evident from their firmness to touch and from the resulting deformity, a semi-flexion of the arm. Examination showed the muscles of the left leg to be in the same semi-tetanized condition.

These muscular contractions were tonic; they had come on gradually and had continued without intermission for several days.

The girl stated that the muscles of the shoulders, neck, and body had not shared in the contracture, and that at no time had there been any embarrassment in the performance of deglutition or of respiration.

The amount of pain was evidently inconsiderable, and was not much complained of.

Ordinary sensibility was but slightly if at all impaired.

To overcome the deformity by forcibly straightening the arm I found impossible, and when carried beyond a moderate degree, the attempt produced pain.

The child had loss of appetite, a furred tongue, slightly feverish temperature (not taken with the thermometer, I regret to say), and a pulse of about 110.

The impulse of the heart's beat was exaggerated, and there was a soft blowing murmur with the first sound.

I directed tincture of iodine to be applied to the knee, and five grains of salicylic acid to be given every two hours.

Three days later I visited the patient at her house.

The medicine had been taken as directed, so that the first day of its administration, between the hours of 3.30 P.M. and 9.30 P.M., she had taken four doses, equal to twenty grains. That night she was, according to report, quite feverish and thirsty, and wandered in mind.

The second day, between 5.30 A.M. and 2.30 P.M., she took five doses, equal to twenty-five grains.

At this time she became sick to the stomach and vomited, and the medicine was omitted.

The feverishness, however, subsided, the appetite was restored, the contracted muscles began to relax, so as to allow of nearly complete extension of the arm, and of her walking in the natural manner with the sole of her left foot planted squarely on the floor. At the same time there was a decided diminution in the swelling and tenderness of the affected joints. During the following night she was very comfortable and slept well. On the third day she took but two of the powders of salicylic acid, and the medicine was not again resumed.

At the time of my visit the girl was perfectly comfortable, complaining of no pain whatever; appetite, digestion, and condition of the bowels excellent; pulse 100; temperature, taken in the mouth, 99.5 F. The flexor muscles of the arm and forearm were still slightly contracted, making it impossible for me to forcibly extend the arm and hand to the full degree. The elbow and knee were still somewhat tumefied, and there existed slight contracture of the posterior femoral muscles. The internal hamstring was particularly salient, and felt firm and unyielding to the touch.

This patient was seen a few days later, at which time there remained not a vestige of the contracture, and only a slight trace of the former rheumatic trouble about the left knee, its circumference being a little greater than that of the right.

For the opportunity of seeing, and of making this use of the second case that I shall present, I am indebted to the kindness of Dr. E. C. Seguin, at whose clinic for nervous diseases, at the College of Physicians and Surgeons, the patient presented himself for treatment in February, 1876.

CASE II.—G. H., male, aged eighteen years; born in the United States; has been a sickly boy since he was four years of age; at

which time he is said to have had measles, followed by some inflammatory trouble of the spinal cord and brain, which produced tonic spasms of his body and limbs.

After that he was subject at intervals to cramps affecting one side, or even the whole of his body, often only contracting the muscles of one arm, but rendering the other muscles stiff. The condition would persist during sleep, and generally continued two or three days, when it would entirely pass away.

These attacks were generally heralded by a depressed and irritable state of mind, in which the boy was easily crossed or provoked to tears, and yet was stupid and preferred to be by himself. Preceding these attacks there was dysæsthesia, consisting of a feeling of numbness, or a sensation like that of the passage of electricity through the extremities to be affected. On the eve of one of these attacks this boy would often talk and scream in his sleep, and even walk about in a state of somnambulism.

The first appearance of the contracture would generally be in the morning or at night, and consisted sometimes of adduction and flexion of the thumb on the palm, with flexion of the fingers over the thumb so as to cover it; flexion of the hand on the forearm; of the forearm on the arm; while the arm was either drawn across the chest, or raised in such a way as to bring the hand up to the nape of the neck or to the occiput. The leg of the same side would become stiffened and the muscles contracted, so as to make the foot assume the position of talipes equinus. Sometimes the fingers and thumb would be fixed in the form of a cone (a position "so peculiar," says Trousseau, "that it is oftentimes sufficient by itself to characterize this kind of contraction." (*Lectures on Clinical Med.*, by A. Trousseau, translated by P. Victor Bazire. Lindsay & Blakiston, Pa., 1867. Part ii., p. 375.) Sometimes again the thumb would be slightly adducted and forced between the fore and middle fingers, while the fingers were extended and separated from each other like the rays of a fan. Sometimes both sides would be cramped at once; at others the left alone would be cramped, or the left would be cramped and the right only made rigid. The boy's sisters said they thought that the right side was never cramped alone.

These contractures were painful, and were never attended with loss of consciousness or decided impairment of the intellect.

Just before and at the time of these attacks his bowels were

most always costive, while he often had a foul breath and a thickly coated tongue.

Two weeks before coming to the clinic, while constipated, an attack had come on in the usual manner, with a feeling of numbness and tingling in the limbs, more in the left side than in the right, and more in the legs than in the arms. Adopting the description of his mother, "he was first cramped in his whole body and then seemed stupid." One arm was stiff and drawn up; the other only stiff. The cramp was constant night and day. The legs were stiff; he took short steps and dragged his feet. His neck was stiff, but there was no opisthotonos. The boy himself has since told me that at no time did he find deglutition impeded; but that at times he found respiration somewhat difficult.

In two days from the first attack there was a remission; but the contracture soon recurred, and persisted without further remission until the night before he was seen at the clinic, a period of about ten days.

When brought to the clinic the muscular system was normally relaxed, and there was not a particle of contraction to be detected. The boy had lost flesh and color, and was anæmic, was stupid, and complained of muscular soreness.

After leaving the college, however, the young man was seized with a decided spasm, and his sister had difficulty in getting him home. All that afternoon, and until seen the next morning by Dr. Seguin, he was in the condition of semi-tetanus. At that time the hands were fixed in a cone-like shape; the head was moderately thrown back, and there was moaning from pain.

There was no increase of temperature, no history of injury. Remembering the statement of Trousseau, that the tonic convulsions of tetany may be produced at will "by simply compressing the affected parts, either in the direction of their principal nerve-trunks, or over their bloodvessels, so as to impede the venous or arterial circulation" (loc. cit., p. 376)—Corvisart also found that compression of the limbs would cause pain and bring on the contracture (Lucien Corvisart, loc. cit.)—I tried this manœuvre upon the patient, but with no effect.

Chloral was given in ten-grain doses at night, with the effect of producing moderation of the contracture and inducing quiet, profound sleep. It was while he was under the influence of this drug that I tried the effect of compression upon one of his arms, with failure to produce the spasm, as I have said. It is quite

likely that the effect of the chloral was sufficient to prevent the result obtained by the above-mentioned authors. The patient was then put upon conium, ten minims of the fluid extract every four hours, the result being that the spasm relaxed for good.

I have been told by the brother and sisters of this boy that, since the last attack, described above, he has been wont to have about every two weeks a feeling of tingling and numbness in his hands, with a certain amount of stupor; that during the night, at such times, he sometimes raves and walks about in an apparently unconscious state, and that the next morning he is found to be in the condition of tetany, which is soon relieved by the administration of the conium. So accustomed have they become to seeing the spasm of tetany appear on the morning after this conduct, that they have learned to recognize in these moods, and in this conduct, the sure prognostic of a coming attack, and, thus warned, they resort immediately to the above-mentioned remedy and thus avert the attack.

REMARKS.—In these two cases we see the onset of muscular spasm, varying in degree from a slight stiffness to extreme contracture, announcing itself with but little warning, and without lesion or apparently sufficient cause. The spasms are of the tonic variety and have periods of intermission. Unlike the spasms of tetanus, they make their appearance and expend in the extremities, advancing centrally, to a limited degree only, and with reluctance.

The onset of the motor symptoms is often heralded by perversions of sensation that are referred to the affected parts, the extremities; and the muscular spasm is often so severe as to produce violent pain. The departure of these spasmodic attacks is often as inexplicable and as sudden as their onset.

In the case of the boy, G. H., the palpable motor-symptoms were anticipated also by some intellectual disturbance and obfuscation, which recurred with such regularity as to well-nigh preclude the idea of mere coincidence.

Looking at the general constitutional state, in the case of the girl, F. S., there was a slight febrile movement, which was not, however, noticed in the boy, No. 2. But it should be remarked that, in both cases, there was a depraved condition of the mucous membrane of the alimentary tract, showing itself by furred tongue, with accompanying loss of appetite; and in the boy, also, by a constipated condition of the bowel. In the girl we cannot

afford to lose sight of the fact that the motor trouble was preceded by an engorged, and blood-secreting, later pus-secreting, condition of the mucous membrane of the genitalia. The discussion of this matter properly belongs under the head of the pathology and causation of the disease.

As regards the diagnosis of the two cases, there is no doubt in my own mind that they are both to be classed as belonging to that class of spasmodic affections termed tetany. Before proceeding to the differential diagnosis between tetany and the other diseases with which it might be confounded, let me give a little more fully an account of the symptoms of tetany.

Tetany consists either of one attack or of a succession of distinct attacks, which often give warning of their near approach, by lassitude, a feeling of mental depression and heaviness, or sometimes irritability; perversions of sensation or *dysæsthesiæ*, consisting of numbness, formication, painful tingling of the extremities, even twinges of pain shooting along the shafts of the limbs.

The motor symptoms announce their onset by slight muscular stiffness, which waxes more and more intense, and ere long passes into rigidity and painful contracture. This affects by preference at first the fingers and hands, then the whole of the upper extremities, beyond which, in a considerable proportion of cases, the contracture does not go. In the upper extremities, the flexor, adductor, and pronator muscles are more affected than their opposites. As a result of this, in the upper extremity, it is very common to see the following characteristic deformity: the palm hollowed and creased by the approximation of its two borders, the thumb strongly adducted, and thumb and fingers slightly flexed at their first metacarpo-phalangeal articulations, and applied to each other in such a manner as to form a cone; or the fingers may be clinched over the flexed and adducted thumb, so as to make a fist. The hand is generally flexed at the wrist, the forearm on the arm, while the arm is flexed across the chest, or sometimes drawn up towards the head, as the result of a varying degree of contracture of the pectoral muscles and those of the shoulder.

In the upper extremities the contraction may cause them to assume other positions than those just described. Thus, the fingers, hand, and arm may be in extension instead of flexion, in supination instead of pronation. In the lower extremities the toes are flexed on to the sole of the foot, the heel is drawn up, and

the knee is extended, while the whole leg is in a state of rigid extension. Often the foot is at the same time placed in such a position as to resemble the deformity of talipes equino-varus. Vleminkx (*loc. cit.*), in his report on the epidemic in Belgium, observed that the toes were flexed, the foot extended, the leg flexed on the thigh, the thigh on the pelvis. Corvisart says, however, "although in two or three cases the thigh was extended inwardly on the pelvis, I have never seen flexion of the knees nor any modification in the natural position of the thigh." (*Lucien Corvisart, loc. cit.*)

The contracture of the extremities is such as to make it impossible for the patient to walk or to grasp with his hands.

The spasm of tetany is, however, not exclusively confined to the extremities. In its severer forms the contraction may extend centrally to the muscles of the abdomen and thorax, causing impairment of respiration; to the back, causing opisthotonos; to the neck, causing dyspnea and difficulty in deglutition; to the masticatory muscles and those of the tongue, causing impairment in the motions of the jaw, or even trismus and difficulty in deglutition. Cases of tetany, in which there was trismus, are reported by Hérard (quoted by L. Corvisart, *loc. cit.*, p. 40), but such forms are rare, and the diagnosis is perhaps open to doubt.

According to Corvisart, the muscles of the anterior and lateral aspects of the neck are in such cases generally affected to the exclusion of those of the posterior region; and the sub-hyoidean muscles, the depressors of the jaw, are much more often affected, and to a higher degree than the masseters, the elevators of the jaw. This he considers a capital difference between tetany and tetanus.

The occurrence, however, of trismus, or of contracture of any of the muscles of mastication in tetany, is generally acknowledged to be very rare, to occur only in an advanced stage of the diseases and only in the severest cases.

The contraction of tetany begins peripherally, never centrally, as in tetanus, affecting by preference the upper extremities. Only in exceptional cases are the lower extremities affected alone. In a few very severe cases there has been observed general spasm of the muscles of the body, as well as of the extremities, a form liable to be mistaken for tetanus.

The contraction of tetany is generally attended with pain, which is proportionate to its degree. The pain is generally in-

creased by pressure of the muscles, or by attempts to restore the limb to its natural position; but sometimes forced extension of the flexed limb relieves the pain.

The contraction, which constitutes the chief manifestation of the disease, often pursues an intermittent course. It generally begins during the night or in the morning, lasting from a few minutes to a few hours, or the larger part of a day, and disappearing in the later part of the day to reappear the next day; or there may be in the same day numerous short attacks with intervals of complete intermission.

"In some cases," says Corvisart, "they (the contractions) last a few hours, frequently half a day, as a rule, from one to three days; some have lasted four, six, seven days, but they are exceptional." (Lucien Corvisart, *loc. cit.*)

Perrin reports a case in which the contracture recurred at intervals of exactly a week, being preceded each time by chill, fever, and sweating. (M. Perrin, *Gaz. Méd.*, 1845, p. 396.)

In many the contracture rather merits the title of continuous, in that it persists without intermission or abatement for days or weeks. In the Belgian epidemic of 1846, the disease was, according to Vleminkx, oftenest of this continuous form.

During the intervals when the patient is free from the contracture and its attendant pains he will seem quite well. There will, however, then be a feeling of muscular weakness, lassitude, and a soreness and tenderness of the muscles when they are manipulated or squeezed.

The contractions of tetany are in the great majority of cases continuous, and consist of tonic unyielding spasm of the muscles. But this is not the only form of spasm that has been observed in tetany. Vleminkx, as before stated, divides the contracture of tetany into *simple* and *spasmodic*. He says: "The contracture sometimes assumes the spasmodic form. Then, in place of permanent flexion of the limbs, of rigidity and permanent tension of the muscles, there are observed convulsive contractions, brisk but transitory, accompanied, or not, by pains, returning in more or less frequent attacks, or by simple *startings*, analogous to those which sometimes accompany disturbed sleep. This form, noticed by M. Tosquinet, is met with only in a very small number of patients." (M. Vleminkx, *loc. cit.*) Corvisart also observed the same transitory clonic spasms, or jerkings, in the case of the patient Brun, Obs. 1. (L. Corvisart, *loc. cit.*) In the same

patient he noticed also fibrillary contractions here and there in the sterno-cleido-mastoids and in the muscles of the legs and fore-arms. No such symptoms were noticed in either of the cases I have reported. From the appearance of the same phenomena in other patients, reported by Corvisart, the occurrence of these clonic motor disturbances of the muscles in tetany would seem to be, if not common, at least well established.

Such are the motor symptoms, and when they have been described there remains very little to be added in regard to symptoms.

The disease is not characterized by any marked rise of temperature. In F. S., Case I., the temperature, taken with the thermometer, was 99.50° F. But it had undoubtedly been higher than this. In G. H., Case II., no fever was observed. In a case of "tetanilla," reported by Mr. Knott (Guy's Hospital Reports, 3d series, vol. xviii., p. 142), the temperature was noted as high as 101.6° F. Increased frequency of the pulse is a rather common symptom.

Vleminkx says that in certain cases the temperature was lowered and the pulse went down to 50 or even 40 per minute. In some of the cases that occurred in the Belgian epidemic the patients were affected with œdema, general or partial, and ascites. Vleminkx speaks also of two cases in which occurred spontaneous gangrene, causing in one case sloughing of the skin of the scrotum, and in the other of that of the right foot and leg. It is difficult to say whether these grave and unusual symptoms are to be considered as part and parcel of the disease or rather as complications due to some other cause. I am inclined to the latter opinion.

The electro-muscular reaction in tetany has been studied by several observers. In a case which Lucien Corvisart examined by means of electricity, the muscles were found to be extremely sensible, and muscular reaction was exaggerated. The application of the electric current—of which variety is not mentioned—caused pain and aggravated the fibrillary and muscular contraction. Erb found both the faradic and galvanic excitability of the principal motor nerves was exaggerated. "The greatest increase of excitability coincided with the time of the best marked and most frequent attacks of tetany, and there was a decrease in the excitability as they became less frequent, and, finally, when the patient had completely recovered, the electric excitability was found to be approximately normal." (Erb, Ziemssen's Cyc. of

Pract. Med., article on Tetany. Buck's translation, vol. xi., p 372.)

In a case of tetany which I have seen since writing the above there was decided decrease of susceptibility to the galvanic current in the upper extremities; so that a strong current (35 cells of Stoecher's battery) was necessary to produce any reaction, and in most of the flexor muscles of the forearm, which had been principally affected, and were still somewhat contracted at the time of the examination, even this current failed to produce any perceptible effect.

These same muscles, however, reacted, though with diminished force, to the faradic current, which was tried immediately afterward. The electric reaction of the muscles in this case, then, was normal or slightly diminished faradic reaction, and decreased or lost galvanic reaction. Though seen but once, I was convinced that the case was one of tetany.

Tetany presents the greatest variation in its course and in the number of its attacks. The disease sometimes comes to an end with the first attack, but more often exhibits multiple attacks, which may be distributed over days, weeks, and months, the whole period, however, seldom being of short duration. According to Corvisart, the disease may end with a single attack, which is rare, or with three, four, or five, which is more common. The first attack is generally more severe than the others.

Tetany usually terminates in complete recovery, though in some cases paresis of the muscles affected has persisted for some time. In other cases the morbid tendency displays itself over and anon by a recurrence of the attack in full force after having for weeks or months remained latent and to all appearances eradicated. Such was the case in J. H., Case II.

The prognosis of tetany is in the great majority of cases assuredly favorable. In any particular case, however, this will depend chiefly upon the severity of the attack, which is to be measured by the degree to which the contracture has extended centrally. Cases are reported in which death has been caused by the contraction proceeding centrally so far as to produce spasm of the larynx or diaphragm; also others in which death followed general spasm, in which cases the affection of the muscles of respiration was doubtless the fatal element.

Vleminkx speaks of the disease as almost always ending in recovery. "There are, however," says he, "several cases of fatal

termination. In certain cases death comes almost instantaneously, caused no doubt by an unconquerable contraction of the respiratory muscles, and perhaps also, according to the wise suggestion of Tosquinet, from spasm of the heart. In others death comes gradually after some days of fever, and there is reason to suppose, though the reports are unsatisfactory on this point, that it was the result of secondary organic changes." (Vleminkx, loc. cit.)

In infants the disease presents symptoms not different from those in the adult, and the prognosis seems to be quite as favorable in them as in grown-up people. Bouchut declares that essential contractures do not destroy the lives of infants. (Bouchut, *Traité pratique des Maladies des Nouveau-nés, des Enfants à la Mamelle, et de la seconde Enfance*. Paris, 1873, p. 111.)

As to causation much may be said, but not much that is satisfactory or decisive. One of the most important exciting causes of tetany undoubtedly is exposure to cold and dampness. The Belgian epidemic of tetany, to which I have often alluded in this paper, was actively in progress in May, so that its rise was in the damp, cold season of spring. Corvisart says that two-thirds of his cases (twenty-five in number) were seized with the attacks during the months of February and March. The other third were equally divided between December and January on the one hand, and April and May on the other. "It ought to be remarked," says Corvisart, "that in these latter cases it was precisely when the temperature was cold and the season such as is called late." "Of the patients entered into hospitals under the eyes of physicians, the majority correspond with the cold seasons," (Corvisart, loc. cit.) Both of the cases related by myself occurred in the period of damp, cold weather, one in April, the other in February.

According to Bouchut, "it [tetany] is chiefly a disease of infancy. It is more common in the first three years of life than in the whole period which separates this age from puberty." (Bouchut, loc. cit., p. 109.) Of twenty-two cases of tetany tabulated by Corvisart, the ages of whom are mentioned, sixteen were between seventeen and twenty-one years old. (Corvisart, loc. cit.)

Trousseau at one time gave to the disease now known as tetany the title of *intermittent rheumatic contractions*, thus formulating his belief that the pathological condition which gave rise to the spasms was rheumatism. He had previously called attention to

the fact that this disease is specially liable to affect women who had been recently confined and who were nursing, and he accordingly called it *rheumatic contraction occurring in nurses*.

My own opinion is that in these females attention should be given not to the circumstance of lactation, but to the condition of the genital organs proper as bearing upon this point. Let me again call attention to the girl, F. S., Case I., in whom the attack was preceded by an abnormal catarrhal and pus-secreting condition of the vaginal mucous membrane, due to the application of cold while menstruating.

It is true this girl also had rheumatic inflammation and effusion into joint cavities, but this seemed to be merely a complication, and to have no causative agency; for the rheumatic affection outlasted the spasm, which was not true of the vaginal catarrh.

It is evident, however, that other pathological conditions besides those incident to rheumatism, parturition, and lactation frequently coincide with it if they do not act as causative agents in the production of tetany.

"Diarrhœa, especially when abundant and chronic," is said by Trousseau to exert a most striking influence in the causation of tetany.

To this, it seems to me, should be added as of almost equal importance, a constipated condition of the bowels.

My own belief is that irritation of the alimentary canal, whether from diarrhœa or constipation, is capable of acting as an efficient cause in producing tetany. In all the cases of tetany I have seen, now three in number,* there has been derangement of the digestive tract. In one there was a constipated, and in two a diarrhœal condition of the alimentary canal.

Trousseau mentions the case of a young man in St. Agnes' Ward, in whom contractions co-existed with obstinate constipation, and disappeared, on the contrary, when the bowels were freely acted on by purgatives.

In searching for a factor common to all these conditions, it seems to me it is to be found in an irritation seated sometimes in the genital organs, sometimes in the alimentary canal, and some-

* While engaged upon this article, since writing it, I have met with a third case of tetany, occurring in a woman fifty years of age. In her case there existed constipation and a very foul condition of the mucous membrane of the alimentary canal indicated by a heavily coated tongue and a fetid breath.

times, perhaps, in synovial membranes. If this be true, the cases thus caused might be considered as belonging to spasms originating reflexively from peripheral irritation.

According to the general testimony of medical men, tetany appears most frequently among those whose health has previously been poor. The disease is one of debility. Depressed vitality, coming of hardship, exposure to cold and damp, insufficient nutrition, excessive lactation, and other debilitating causes, undoubtedly render more probable the onset of tetany.

Pathological anatomy has done little or nothing toward definitely elucidating the essential nature of the lesions which are productive of tetany. These must be, so far as the nerves are concerned, transitory in their nature, and probably far too minute to be capable of detection by any of the ordinary methods of investigation. How far, if at all, the central nervous system is to be considered as probably involved in the pathological nervous process responsible for the affection is still *sub judice*.

The differential diagnosis between tetany and other spasmodic affections, while it will present no great difficulty, deserves some notice. From tetanus tetany is to be distinguished chiefly by the fact that in tetany the spasm begins peripherally, and in its central progress rarely if ever affects the muscles of the neck and chest, whereas, on the contrary, tetanus begins centrally and advances peripherally. Tetany is also to be distinguished from tetanus by the absence of traumatism and of fever. Though in tetany there is an upward ranging of the temperature, yet the fever is not marked. In Mr. Knott's case, previously mentioned, it rose to 101.6° F.

I cannot imagine that any one should find difficulty in distinguishing tetany from epilepsy. But this might not be true of hysterical contracture. Cases might occur in which care would be needed to distinguish between the two, but by due consideration mistake might infallibly be avoided.

The treatment of tetany may well consist of measures calculated in the first place to remove the exciting cause, if such is found, and in the second place to arrest the muscular spasm.

In pursuance of the first end, attention should be given to the condition of the bowels, the genital organs, of the mammary glands if the patient is a nursing woman, and to relief of the rheumatic taint if the patient is so afflicted.

Salicylic acid offers us such a reliable means of mastering acute

attacks of rheumatism that it seems hardly necessary to call attention to its promise of usefulness in cases of tetany accompanied by, or depending upon rheumatism. I would remark of the doses given to the girl, F. S., Case I., that they were entirely too small.

For the relief of the spasm, conium and chloral' seem to furnish good results.

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